

Individual Adopter School Case Study: St. George

St. George Public School, Region 5 – MidCoast

Background

St. George Public School (“St. George”) is a rural coastal municipal school unit (MSU) in MidCoast Maine that serves approximately 280 students in its K–8 school. St. George has deep historical ties to the fishing industry, which continues to be a key to the town’s economic vitality and involves many year-round community members. The median household income (\$52,572) is slightly less than the state average. However, the percentage of students identified as economically disadvantaged or eligible for free/reduced lunch is slightly lower than the state average (Table 1).¹

TABLE 1: SOCIOECONOMIC AND DEMOGRAPHIC CONTEXT

	SAU	Maine
Number of Students	278	178,860
Locale Classification	Rural	N/A
Students Identified as White	98%	88%
Students Identified as Economically Disadvantaged	40%	41%
Students Eligible For Free/Reduced Price Lunch (St. George Public School)	33%	44%
Students Identified with Disabilities	17%	18%
Student/Teacher Ratio	10.20	N/A
Median Household Income	\$52,571	\$57,918
Adults with a Bachelor’s Degree or Higher	33.3%	32%
Adults in Labor Force	58%	63%

Sources: Maine Department of Education, National Center for Education Statistics, and U.S. Census Bureau

Development of pilot project

In 2016, St. George convened a working group of school administrators and staff, parents, and community members to discuss the school’s programs and facilities. These stakeholders identified career and technical education (CTE) as a community priority, with an emphasis on hands-on technical programs that could strengthen the economic resilience of the local area.

¹ School data was collected from the Every Student Succeeds Act ([ESSA Dashboard](#)) reported by the Maine Department of Education and the National Center for Education Statistics ([NCES Search For Schools](#)) database. SAU information was collected from the Maine [ESSA Dashboard](#), the [NCES Search For Schools](#) database, and the NCES Education Demographic and Geographic Estimates ([EDGE](#)) database. Information about the State of Maine was collected from the [ESSA Dashboard](#) and the [U.S. Census Bureau Maine Quick Facts](#) report. Note, the Students Eligible For Free/Reduced Price Lunch on a state level contains data from the 2018-2019 school year (the most recent publicly available data for the state), while both school and SAU contain data from the 2019-2020 school year.

In response to this, and with a donation from a local community member, St. George began a *Makerspace Initiative* in 2016 to introduce students to new ideas, career opportunities, and ways of learning. When asked about the goals of the overall initiative, one administrator reported that they sought to engage *all* students, but felt the model would be especially valuable for two groups of students. The first group of target students were those with academic and behavioral difficulties who were discouraged and disengaged in traditional classrooms, and had low attendance, and they were more at risk of dropping out. Some of these students needed hands-on/minds-on activities to learn and demonstrate their knowledge and skills. School leaders felt that without this type of learning, these students could disengage or act out in class. The second target group of students did well in school academically and behaviorally but preferred to engage in their learning in a different way by building, innovating, and acting as young entrepreneurs. The *Makerspace Initiative* is intended to re-engage both groups of students while acting as a catalyst for innovative projects and teaching practices that benefit all students.

The school's superintendent, the technology and makerspace director, and a STEAM (science, technology, engineering, arts, and math) educator participated in a Winter 2020 session of the Innovative Mindset Professional Development (IMPD) course. The team entered the course with the idea of using a Rethinking Responsive Education Ventures (RREV) award to build on their existing Makerspace Initiative, and they fine-tuned this idea during the course. In particular, they credited the IMPD course with helping them identify a need to make the CTE programming more accessible for all students and to create pathways for students to continue CTE programming through high school graduation.

Program description

In August 2021, St. George received a RREV award (\$250,000) to strengthen their CTE programming, especially by expanding access for kindergarten (K) through 8th grade students. Specifically, RREV funding will be used to build a K–8 CTE Makerspace Building at the school. According to the RREV application, St. George's Makerspace Building is not only a “place” where people and students gather to build, create, and innovate, but also an “idea”—students learn best while participating in creating something tangible and meaningful.

According to St. George's RREV application, the construction of the new building is intended to support the school's broader CTE program goals, including accessible CTE programming, new pathways to graduation, and helping students gain employable skills. A school administrator said that in the 2021–22 school year a key component of implementing the model includes developing scope and sequence that integrates CTE with core academics, with the goals of getting students college- and career-ready, enhancing future employability, and fostering technical and job-specific skills. Although St. George will primarily focus on providing CTE education to their PreK–8 students, the school has partnered with nearby Mid-Coast School of Technology (MCST), a regional career and technical education school that provides high school-level programs, adult education, and college courses. By partnering with MCST, St. George students can continue engaging in CTE programming through graduation. Typically, St. George high school students have the option to attend MCST while receiving their diploma from another one of their receiving high schools. The Pre-K-12 CTE program will allow students to enter high school with greater technical skills and a deeper understanding of professions in the trades and technical fields. According to St. George leadership, this program will allow students

to advance more quickly through MCST courses and increase the number of students pursuing occupations in the trades and technical fields.

Resources	Strategies and Activities	Outputs	Short-Term Outcomes	Long-Term Outcomes	Impact
RREV resources and coaching	Establish a CTE working group composed of St. George School staff and Board members, MCST staff and Board members, St. George parents, and community stakeholder including local business owners and contractors to design K-8 CTE scope and sequence	Number CTE working group meetings	Strengthened relationships between St. George and the community and local institutions, including MCST, local businesses	Increased enrollment and retention of St. George alumni at MCST	Greater integration of St. George and the local community and economy.
Institutional experience and community buy-in from existing Makerspace Initiative		Development of a K-8 CTE scope and sequence		Improved student career readiness	
Mid-Coast School of Technology (MCST)		Number of teachers who incorporate CTE in their lessons and activities		Improved graduation rates	
MCST Grant for shop equipment		Hire a St. George CTE teacher		Number of CTE-related lessons and activities	
ESSER Money	Provide professional development to teachers on incorporating CTE activities in their lessons.		Number of students who participate in CTE educational activities such as 3D printing, laser cutting, and programming		Completion of architectural drawings
Private donations		Conduct community outreach and fundraising, including presentations, social media		Construction of	
Business sponsorships					
Personnel – Tech Makerspace director					
STEAM Educator					
Volunteers					
Teachers					

	posts, and letters to families.	Amount of funds raised	Makerspace building		
	Raise funds from state and local grants, private donations, business sponsorships, and Buy-a-Brick campaign.	Architectural drawings completed			
	Engage an architect to produce plans for Makerspace building	Construction of Makerspace building completed			
	Construct Makerspace building				

Innovativeness and responsiveness of learning model

St. George's program is innovative and responsive for three main reasons:

1. **It provides CTE across all grade levels, including students younger than those traditionally served by these programs.** CTE programs have generally been offered to students in higher grades, so St. George's program is innovative because it extends CTE programming to students starting in PreK. Moreover, St. George's partnership with MCST provides a pathway for CTE opportunities throughout a student's entire PreK–12 experience.
2. **It promotes new ways to demonstrate learning.** St. George administrators will work with teachers to think about new ways for students to demonstrate learning compared to traditional assessments or writing assignments. St. George leadership believe the CTE program will allow students to use a range of abilities and creativity to demonstrate successful learning through hands-on educational opportunities not currently available to them. For example, a St. George administrator explained that instead of taking a written test on water quality, students could build a probe to monitor the salinity and temperature of the marsh next to the school.
3. **It is integrated in the local community.** As noted earlier, St. George convened community working groups to inform the development of their CTE programming. This input is reflected in several aspects of the program, including its emphasis on helping students develop employable skills that are in demand locally (e.g., town, region, and state). The technical skills and innovative thinking students can learn through the PreK–8 CTE program at St. George and the high school courses at MCST will allow them to enter high paying jobs in their local community. The skills they develop—from woodworking to welding, from computer programming to operating a CNC router—are in high demand and necessary to the economic resilience of the community.

INNOVATIONS

St. George *Makerspace Initiative*

- Expands CTE to younger students
- Allows students to demonstrate learning in non-traditional ways
- Developed to support students and the community

Implementation of learning model

Makerspace Building Development

During the 2021-2022 school year, St. George hired an architect and created a CTE working group to inform the design of the CTE makerspace building and development of the anticipated Makerspace programs. This working group met six times during the school year, and as of June 2022, St. George administration reported that almost all (90%) of the architectural drawings for the building had been shared with this working group.

Additionally, St. George has raised over \$1.4 million in funds procured from state and federal grants (including RREV), private donations, business sponsorships, and a school initiated “Buy-A-Brick” fundraising campaign. St. George anticipates reaching their goal of \$1.5 million by the end of summer. With their fundraising goals nearly reached, St. George leadership anticipate that construction of the K-8 Makerspace building will begin by late 2022.

Curriculum Development

During the 2021–2022 school year, St. George began planning their K-8 CTE scope and sequence. This curriculum is intended to build on the ongoing work of their technology and makerspace director and STEAM educator.

As of June 22, St. George administration reported that a group of teachers met several times throughout the school year to begin developing the CTE scope and sequence specifically for grades 5-8. This group also met with the Director of MCST who provided guidance on adapting CTE learning standards for elementary and middle school level students. During interviews, one teacher shared that one of the ultimate goals of the scope and sequence is to provide all K-5th grade students a flexible and natural introduction to CTE while providing a more focused CTE curriculum to students in grades 6th-8th that aligns with common core standards. St. George anticipates the PreK-8 scope and sequence to be completed by spring 2023.

Ongoing CTE Experiences

Although the PreK-8 CTE Makerspace building has not yet been constructed, students at St. George continue to engage in a variety of CTE educational activities that utilize their current Makerspace area, such as 3D printing, laser cutting, and programming activities. These activities are either led by the Makerspace and Technology Director, STEAM educator, and teachers who have integrated CTE activities into their lesson plans.

The Makerspace and Technology Director reported that he engages students in CTE activities one-on-one, in small groups, and in whole classes alongside classroom teachers. The Makerspace and Technology Director reported regularly interacting with teachers and staff at the school to explore how the Makerspace could support or enhance student experiences.

The STEAM educator shared details about her role as the school's STEM educator. Additionally, K-8 students participate in a STEAM class once a week with the school's STEAM educator. Through her classes, she noted that she strives to engage students in hands-on, kinesthetic learning that aligns with what their learning in their core classes, and often incorporates CTE activities. For example, the STEAM educator engages students in building two- and three-dimensional automats and programming through Sphero. St. George's Makerspace and Technology Director and STEAM educator also lead the robotics club for 8th grade students to build robots. During this past school year, students in the club competed in a Lego robotics competition.

Several teachers interviewed shared that they have incorporated CTE activities into their lessons. For instance, one teacher reported that CTE is incorporated into each unit, sharing that *"whether it be in math or with our ELA...Once per unit there's something built in where we're integrating hands on [learning] where we're building or working with [the makerspace director]."* Teachers interviewed noted that the Makerspace and Technology Director actively helps coordinate and implement these activities.

Outcomes

Outcomes of the first year of RREV implementation are based on survey results from forty-three parents/caregivers and thirty-one students, as well as interviews with teachers and administration.

Surveyed parents/caregivers in St. George report having access to the responsive educational activities they want. In a parent/caregiver survey (Exhibit 3), all respondents (n=43) agreed that it was very important of moderately important that schools offer responsive education activities, and 88 percent reported that they were very satisfied or somewhat satisfied with such activities offered by St. George. Almost three-quarters (72%) of parents/caregivers agreed that St. George provided more responsive education activities during the 2021-22 school year than the previous year. All respondents reported that they would recommend the CTE/Makerspace program. When asked to explain why they would recommend the program, several parents/caregivers reported that the program prepares students for the futures, and helps value, identify, and build on different skills and talents. For instance, one respondent shared that *“This is the way the world is moving. We need to maximize our children and communities exposure to utilizing technology in ways that expand opportunity. Its all about opportunity, the more you have, the better choice you can make to compliment your strengths.”*

EXHIBIT 3. SUMMARY OF PARENT/CAREGIVER STUDENT SURVEY RESULTS (N=43)

Question	Results
How important is it to you that schools offer responsive educational activities?	Very important – 86% Moderately important – 14%
How satisfied are you with the availability of responsive education activities offered through your child’s school?	Very satisfied – 35% Somewhat satisfied – 53% Neither Satisfied nor Dissatisfied – 9% Somewhat dissatisfied – 2%
Compared with last school year (2020-21), how much opportunity has your child had to participate in responsive educational activities this year? ⁷	A lot more opportunity – 35% Slightly more opportunity – 37% About the same as last year – 21% Slightly less opportunity – 2%
Would you recommend this program to other parents? ⁸	Yes – 100%

Surveyed students report positive views about opportunities and experiences with the CTE/Makerspace program and the creativity it fosters. In spring 2022, a survey was administered to all 4th- 8th grade students at St. George. Most students (80%) who responded (n=31) liked their overall experience in the program and 85% were glad they built and created things this year. Just over three-quarters of students (76%) agreed that these activities helped them learn (Exhibit 4). When asked to explain their favorite aspects of the program, several students noted these activities allowed them to be fun and creative, collaborate with peers, and have a tangible, finished product. While some students noted enjoying specific projects (e.g., robotics, toboggan building, stop motion movies, and rockets) and the trial-and-error process, one student simply noted enjoying the fact that *“there is no limit on what I can make.”* Most respondents noted that they would not change a thing about their experience. However, some students reported that they would like to engage in activities that allow them to build and create more often, with some sharing they would enjoy having a bit more freedom or input into the projects they do.

EXHIBIT 4. SUMMARY OF STUDENT SURVEY RESULTS (N=31)

To what extent do you agree or disagree with the following statements	Strongly or somewhat agree	Neither agree nor disagree	Somewhat or strongly disagree
I am glad I built and created things to learn this year.	85%	11%	4%
Building and creating things helped me learn this year.	76%	20%	4%
Overall, I liked my experience building and creating things to learn this year.	80%	15%	4%
This year, I had more opportunities to learn outside a traditional classroom than in the past.	52%	26%	22%

Educators interviewed perceive that students take pride in their work and are able to find “their path” at school. During interviews, teachers and administration reported on their perceived impacts of the current CTE/Makerspace. Several teachers reported that students who engage in these activities take pride in their work and are excited about learning and creating something tangible. Moreover, several staff echoed similar examples of how makerspace activities help students find their path in school. For instance, several staff explained how a former 5th grade student who was struggling to engage in school through the traditional coursework was able to work with the Makerspace Director, spending time in the makerspace and engaging in CTE activities. This experience had a significant impact on this student, as he was able to re-engage in his school work and create goals around one day becoming an engineer.

Teachers interviewed “go beyond” traditional classroom instruction. During interviews, teachers noted that the school’s current CTE initiatives encourage them to be creative in their lesson planning to engage their students in more CTE activities and learning that is “fun.” School administration also noted that teachers who actively incorporate CTE activities into their curriculum are inspiring other teachers to get involved as well. For instance, one administrator shared that a teacher who incorporated laser cutting into her lesson on topography and engaged students in creating topographic maps inspired another teacher to modify her class’s final project from a simple drawing of a community to a depiction that community, incorporating both laser cutting and student drawings.

Future Plans

PreK-8 CTE/Makerspace Building: Construction, Curriculum, & Staffing. With construction expected to begin later this year, St. George administration hopes to have the K-8 Makerspace building up and running for the 2023-2024 school year, along with implementation of their K-8 CTE curriculum. St. George administration aimed to develop a draft of the CTE scope and sequence for grades 5-8 by the end of the 2021-2022 school year. As of June 30th, 2022, this scope and sequence has not yet been drafted, but school administration reported that development of the scope and sequence will continue next year, with the plan to submit a curriculum outline to the School Board.

St. George school leadership is currently working internally and with MCST to determine the staff who will run the makerspace building upon completion. Leadership reported that staff will include the current Makerspace and Technology Director and STEAM Educator and may include an additional CTE teacher.

The Makerspace as a Place for Innovation and Supporting the Whole Community. In addition to providing direct opportunities for their K-8 students to engage in CTE activities and programming, administration at the school reported that they anticipate the building supporting the “passion projects” of their students. For instance, a school staff member shared that:

“This is a space where I want anybody in this community to come in with an idea and [our] answer is ‘yes we can support you in doing that,’ whatever that is...I imagine high school kids being like let’s make a go cart from scratch that’s solar powered. We’re not going to buy anything; we’re going to make every piece.”

Moreover, administrators at the school also reported that they intend for the Makerspace building to serve as an economic development and resource center for the larger community. For example, leadership shared that a local organization reached out to the school to see if they could assist in creating/3D printing a specific tool for a local oyster farmer. The Makerspace and Technology Director is currently testing materials to create this tool. Administrators at the school further explained that they envision the CTE/Makerspace building as being a resource for developing tools and resources that are not commercially available.

Lessons learned

Fundraising is challenging, but the community support for the CTE/Makerspace has been critical. According to a member of the St. George School Board, one of the greatest challenges related to the CTE/Makerspace initiative this year has been procuring funding. In addition to COVID-19 related supply chain issues, construction of the Makerspace was delayed until adequate funds were raised. Once the school raised closed to their initial budget estimate of \$1.2 million, school leadership was able move forward with finalizing their architectural plans. A referendum vote planned for mid-July will allow school leadership and administration to begin preparing for the construction bid process.

As noted previously, by June 2022, over \$1.4 million had been raised for the K-8 Makerspace building. The school board member reported that community support for this project has been essential, and that over half of the funds raised (about \$750,000) for have been through direct donations from community members in St. George. The School Board shared that the community is excited about the CTE program and Makerspace, stating that:

“They wish that this opportunity had been available for their children or themselves and they’re really excited for the opportunities it’s going to provide our students and really our overall community – that we hope to be able to expand this building to work beyond the Pre-K to 8 level and be something special for everyone.”

According to the school board member, the CTE Makerspace Building working group intends to continue their public engagement efforts at upcoming “St. George Days” by hosting a table at the event and providing information about the status and plans of the Makerspace. There are also

plans for an in-town newspaper to print a special edition dedicated to the CTE/Makerspace project. Physical copies of the newspaper are planned to be accessible at local stores, the library, and post office.

An inherent challenge is the lack of K-8 CTE examples and models from which to learn.

St. George leadership and teachers noted that one of their biggest challenges is the novelty of PreK–8 CTE programming. Although this contributes to the innovativeness of their model, it also means there are few established CTE programming models for St. George to lean on for younger students. During interviews with teachers, several noted that the lack of CTE models for younger students is a challenge that contributes to the need for additional time and research to develop the curriculum scope and sequence. School administrators reported that they are leveraging their partnership with MCST to build out their K–8 program implementation.